1.1 Radio Astronomy

1.1.1 Maintenance and Calibration

- In preparation for European VLBI observations (EGS project) with DSS-63 antenna, performed several successful Mark 5 recording tests at 1024Mbps (chk1024 procedure). Experiment files were locally generated. Disk modules received from JIVE were conditioned.
- Performed a successful MarkIV recorder recording test after recent station power outages.
- A TDN block has been developed to perform system temperature zenith calibrations (zen_cal) at L and X bands with DSS-63 antenna. Block was used to calibrate system temperature during recent EGS supports.
- Another TDN block has been developed and is currently under testing to configure two down link channels (DCC), and control the noise diodes in order to monitor system temperature variations during dual polarization observations. EAC is just able to control one noise diode.
- Performed several antenna calibration runs for X-band (DOY 283) and L-band (DOYs 288, 301, 302). New pointing models were derived, gain curves were measured, and noise diodes temperature variation versus frequency was calculated. New ANTABFS parameters were derived and Field System rxg_files were changed accordingly.

1.1.2 Research and Development

From DOY 283 all Host Country observations at DSS-63 antenna had to be cancelled, due to incompatibility between EAC XANT application and recent OP-C installation at DSS-63. A workaround implemented locally at exp_control spectroscopy software is currently under testing (ATOT Devel DOY 304).

1.1.3 Observations

1.1.3.1 Host Country Spectroscopy

During this month spectroscopy observations with DSS-63 antenna were carried out using the SPB500 spectrometer and the MarkIV data acquisition terminal. Following Host Country projects were performed using DSS-63 antenna:

- **D63-S01:** study of CCS molecule (22.334 GHz) extended emission in young low-mass proto-stars. The CCS molecule is abundant in molecular clouds during the first stages of star formation. We plan to make maps of its emission in several start-forming regions, to study their physical conditions and chemical processes in the cloud.

- **D63-S02:** search for water maser emission toward optically obscured planetary nebulae. This project will allow testing the prediction that the precursors of planetary nebulae (PNe) might be optically obscured post-AGB stars with water fountains.

- **D63-S09:** Target of opportunity (TO): confirmation of a tentative detection of ammonia (NH3) emission towards a very young and cold brown dwarf.

DOY	minutes scheduled	minutes used	Percent good data	Activity	comments
277	525	525	90	"GBRA Host Country D63-S01/S02"	OK
280	370	370	100	"GBRA Host Country D63-S01/S02/S09"	OK

1.1.3.2 Interferometry

MDSCC participated in 6 Very Long Baseline Interferometric (VLBI) observations (2825 min in total):

- RFC Clock Synchronization on DSS-65 (2 observations; 480 min): For first observation, DSS-65 antenna stopped in azimuth, 5% data lost (DR#M105106). For second observation 100% data collected; performance of the system nominal.
- RFC Catalog M&E S/X on DSS-65 (1 observation; 1090 min): DSS-65 antenna stopped in azimuth, 6 sources were impacted (2% data lost, DR#M105109). Not enough time was provided in the schedule for the tape change, 4 sources were lost (1% data lost, DR#M105113).
- European VLBI Network (EGS project) on DSS-63 (3 observations; 1265 min): for first and third observations 100% data collected, performance of system nominal. For second observation antenna stopped in azimuth, 2 sources lost (3% data lost, DR#M105112). No problems experienced with Mark5 recorder (256 and 1024Mbps recordings). System temperature files were derived using *antabfs* application and sent to EVN archive.